Pasta’s contributions to reducing obesity.

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Obesity

- **Multifactorial** disease
- Multifactorial treatment
- **Dietary, pharmacological and surgery**

- Despite the many benefits associated with weight loss, the **success of dietetic treatment** is still being questioned

- Indeed, in the long run, professional and commercial programs are often considered **ineffective**
Many factors can be influencing these results
Research sometimes is not useful: (university studies)
Studies in real life are necessary
1960s

- Type of diet:
- High in Proteins
- High in carbohydrates
- High in fat
- Etc.
Weight loss

No differences

-5.1 Kg

12 weeks

Landers et al., 2002,
J Okla State Med Assoc

Ann Intern Med. 2010

Nutritional and health
Inter-individual variability
Nutrigenetics

- Stress
- Alcohol
- Diet
- Physical activity
Obesity and fat

Major allele carriers TT increase obesity with fat intake. Surprisingly in minor allele carriers this relationship is not present.

D Corella et al., *Journal of Molecular Medicine*, 2007
Perilipinas: Obesity and carbohydrates


B

Predicted waist (cm)

Complex CHO*PLIN genotype = 0.002

PLIN 11482G>A GG
P=0.446

PLIN 11482G>A GA+AA
P=0.002

Complex carbohydrate (g/d)
• Macronutrient composition may not be decisive in weight loss effectiveness
• There are inter-individual responses
• The goal is to design a diet that may be followed our whole life
The best diet of the world is not useful if the patient doesn't follow it

(80% PATIENTS ABANDON)

Garaulet et al., Nutr Hosp; 2009
Attrition (%) 

- Atkins Zone Balanced: 43%
- Zone High-fat: 60%
- Balanced Low-carb: 36%

Landers et al., 2002, J Okla State Med Assoc
Specific hunger for carbohydrates

This is one of the reasons why after dieting some of us start to crave for sweets specially for chocolate to finish with this specific hunger.
serotonin and depression
Serotonin and depression

Central nervous system low levels of serotonin have been associated with depression, addiction and obsessive-compulsive disorder, and ingestion of carbohydrates, especially chocolate.

HIGH- PROTEIN DIET
3 X = (30% proteins)

BALANCED DIET
(10% proteins)

LNAs: Large Neutral Aminoacids; HEB: Hematoencephalic Barrier
Brain serotonin content: increase following ingestion of carbohydrate diet.
John D. Fernstrom and Richard J. Wurtman
Laboratory of Neuroendocrine Regulation, Department of Nutrition and Food Science, Massachusetts Institute of Technology, Cambridge

In the rat, the injection of insulin or the consumption of carbohydrate causes sequential increases in the concentrations of tryptophan in the plasma and the brain and of serotonin in the brain.

Serotonin-containing neurons may thus participate in systems whereby the rat brain integrates information about the metabolic state in its relation to control of homeostasis and behavior.

Brain Serotonin Content: Physiological Regulation by Plasma Neutral Amino Acids
John D. Fernstrom and Richard J. Wurtman
Laboratory of Neuroendocrine Regulation, Department of Nutrition and Food Science, Massachusetts Institute of Technology, Cambridge

When plasma tryptophan is elevated by the injection of tryptophan or insulin, or by the consumption of carbohydrates, brain tryptophan and serotonin also rise;

However, when even larger elevations of plasma tryptophan are produced by the ingestion of protein-containing diets, brain tryptophan and serotonin do not change. The main determinant of brain tryptophan and serotonin concentrations does not appear to be plasma tryptophan alone, but the ratio of this amino acid to other plasma neutral amino acids.
• Women, especially, are vulnerable to how carbohydrates affect their moods.

• Women normally have one third less serotonin than men. Diets that severely restrict carbohydrates will result in even lower serotonin levels.

• Women on high protein/very low carbohydrate diets are at greater risk for depression, seasonal affective disorder (SAD), carbohydrate crave/binge disorder and severe premenstrual syndrome.

Dr. Judith Wurtman from Massachusetts Institute of Technology (MIT)
The goal is to lose weight in ways that enhance health rather than in ways that may harm.
High-Fat diets: 4% Carbohydrates; 12-33% proteins; 63-94% fats

A wide body of scientific evidence links the consumption of animal protein, saturated fat, and cholesterol with CVD, cancer, and other chronic illnesses.

70% of patients on an Atkins diet for 6 months were constipated, 65% had halitosis, 54% reported headaches, and 10% had hair loss.

High-protein diets may cause loss of calcium and decreased levels of urinary citrate, leading to osteoporosis and kidney stones.

Ketone bodies formed on a high-protein diet undergo urinary excretion to maintain electrical neutrality, resulting in the loss of cations such as calcium, magnesium, and potassium.

An Atkins diet may increase postprandial lipemia and increase free fatty acids, which may have harmful effects on platelet aggregation and may promote ventricular arrhythmias.

Adverse vascular effects not reflected in serum markers.
References


Vascular effects of a low-carbohydrate high-protein diet.

Moreover, the deleterious effects of some genes are only present when the subjects have a high fat diet.
MEDITERRANEAN DIET: a good alternative

- New evidence points towards a possible role of the Mediterranean diet in preventing overweight/obesity.
- Different Mediterranean-style diets have been shown as a safe strategy for the treatment of obesity.
- A greater adherence to the Mediterranean diet has been associated with a lower prevalence of abdominal obesity.
- Recently it has been proposed that the Mediterranean Diet is particularly effective on glycemic control.

To avoid all these problems.
Cereals

Abundance of vegetables and fruit

Olive oil as the principal fat

Dairy products (cheese) in low to moderate amounts

Foods from animals in limited amounts (high consumption of fish)

Wine in moderation and with meals
The Mediterranean diet as a complex carbohydrate-rich diet

50-55% of the total calories of the diet come from carbohydrate.
<table>
<thead>
<tr>
<th>Pasta</th>
<th>Glycemic Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cheese tortellini</td>
<td>50</td>
</tr>
<tr>
<td>Fettucini</td>
<td>32</td>
</tr>
<tr>
<td>Linguini</td>
<td>50</td>
</tr>
<tr>
<td>Macaroni</td>
<td>46</td>
</tr>
<tr>
<td>Spagh, 5 min cooked</td>
<td>33</td>
</tr>
<tr>
<td>Spagh, 15 min cooked</td>
<td>44</td>
</tr>
<tr>
<td>Spagh, protein enriched</td>
<td>28</td>
</tr>
<tr>
<td>Vermicelli</td>
<td>35</td>
</tr>
</tbody>
</table>

Low glycemic index < 55
- Low glycemic index load
- Beneficial even for diabetics
- Half of the energy than fats
- They stimulate their own termogenesis
- An important filling effect (increase satiety)
- Glucose is the main nutrient for cells
- Specific hunger for carbohydrates
Legumes, the poor man´s meat

• Lentils, chickpeas, white beans
• Protein rich (*rhizobium*).
• **Pulses + rice = Protein complementation**
  • High fiber content (3 x higher than fruits)
  • High calcium content
  • Important volume and high satiety power
  • 7%-8% reduction in mortality ratio for every 20g increase in daily legume intake
  (Blackberry et al., 2004)
• Low GI: lentils: 28, Soybeans: 18
Legumes, fiber content

- 1 banana: 2 g
- 1 kiwi: 9 g
- 1 slide of brown bread: 4 g
- 1 Orange: 3 g
- Lentils, beans and chickpeas: 15 g
- 1 salad, of lettuce, tomato and onion: 8 g
The high-carbohydrate/high-fiber diet reduced the postprandial incremental areas under the curve of triglyceride-rich lipoproteins, in particular, chylomicrons.

Diet rich in carbohydrate and fiber, essentially based on legumes, vegetables, fruits, and whole cereals, may be particularly useful for treating diabetic patients because of its multiple effects on different cardiovascular risk factors, including postprandial lipids abnormalities.
Garaulet Method
since 1993

Mediterranean
• Weekly distribution

Breakfast
Three groups of food

Main food
2 -3 day legumes
1-2 day pasta
1-2 day rice
2 days vegetables as main dish
2 days meat or fish

Dinner
Rest to complete portions

Olive oil as the unique fat
Vegetables free

Garaulet et al., Nutr Hosp; 2009
Weekly weight loss
N = 1450

10% initial weight (9 kg) 650g per week

- Garaulet M et al., Journal of Human Nutrition and Dietetics, 1999,
- Corbalán-Tutau MD, Morales EM, Baraza JC, Canteras M, Garaulet M, Nutrition, 2009,
Changes in Patient’s dietary intake with treatment

<table>
<thead>
<tr>
<th>Intake</th>
<th>Initial</th>
<th>During treatment</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Energy (kcal/day)</td>
<td>2016.3 ± 667.1</td>
<td>1350.8 ± 265.2</td>
<td>0.0001</td>
</tr>
<tr>
<td>Proteins (%)*</td>
<td>16.5 ± 3.7</td>
<td>18.8 ± 2.3</td>
<td>0.0001</td>
</tr>
<tr>
<td>(g/day)</td>
<td>82.6 ± 30.6</td>
<td>63.0 ± 11.6</td>
<td>0.0001</td>
</tr>
<tr>
<td>Carbohydrates (%)*</td>
<td>39.6 ± 9.4</td>
<td>47.4 ± 5.6</td>
<td>0.0001</td>
</tr>
<tr>
<td>g/day</td>
<td>198.1 ± 78.9</td>
<td>159.5 ± 33.8</td>
<td>0.0001</td>
</tr>
<tr>
<td>Fats (%)*</td>
<td>43.8 ± 8.2</td>
<td>33.8 ± 5.4</td>
<td>0.0001</td>
</tr>
<tr>
<td>(g/day)</td>
<td>99.2 ± 40.3</td>
<td>51.2 ± 14.8</td>
<td>0.0001</td>
</tr>
<tr>
<td>Fiber (g/day)</td>
<td>18.6 ± 10.2</td>
<td>22.07 ± 6.4</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

Data are expressed as means ± SD, P<0.001 considered significant. * Derived from total Energy Intake.

During treatment 89% of the subjects achieved all the Mediterranean recommendations, while 11% did not attain the diet recommendations.
Attrition (%)

Corbalán-Tutau, et al (from Garaulet) 2009, Nutrition
The good results in adherence

- **Mediterranean style diet approach**
  - Subjects find this diet tastier than the low-fat regimens tried before.
  - Olive oil enhances the flavor of certain foods and may contribute to increase vegetable intake.
  - Pasta is also related to a higher intake of vegetables
  - Increase of legumes such as lentils, beans and chick peas, improved the fiber intake, which increased satiety contributing to control of calorie intake

- Inclusion of elements from **behavioral therapy**
By means of this daily log, the patient may, for example, learn at what times they eat, that they eat when stressed, depressed, bored, in the company of certain people.
<table>
<thead>
<tr>
<th>Hour</th>
<th>Food and drink consumed</th>
<th>Place</th>
<th>Portions Optional calories</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:00AM</td>
<td>1 glass milk + sugar 1 toast with ham 1 orange juice</td>
<td>Bar</td>
<td>* 1Ma, 1B, 1P, 2F, 20 kcal</td>
<td>Toast weighed approx. 60g, though I did not weigh it.</td>
</tr>
<tr>
<td></td>
<td>1 salad + oil 1 plateful lentils + rice 1 cup fruit salad</td>
<td>Home (dining-room)</td>
<td>* 2V, 1B, 1P, 1Fat, 2F</td>
<td>I did it great, I felt satisfied.</td>
</tr>
<tr>
<td></td>
<td>1 portion chocolate</td>
<td>Home (bedroom)</td>
<td>150 kcal</td>
<td>I was bored reading in my bedroom</td>
</tr>
<tr>
<td></td>
<td>Sandwich cheese + ham 1 low-fat yoghurt + cookies 1 banana</td>
<td>Home</td>
<td>1B, 2P, 1M, 1F</td>
<td>I felt completely satisfied</td>
</tr>
<tr>
<td>3:00 PM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7:00 PM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.00 PM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

80-90% Group assistance

✓ Garaulet M et al., Journal of Human Nutrition and Dietetics, 1999, II= 1,14
Have you lost your motivation?

- Yes
- Sometimes
- No

Corbalán-Tutau MD, Morales EM, Baraza JC, Canteras M, Garaulet M, Nutrition, 2009, II=2,28
<table>
<thead>
<tr>
<th>Year</th>
<th>Study</th>
<th>Attrition Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>Jeffrey et al (1)</td>
<td>80%</td>
</tr>
<tr>
<td>1999</td>
<td>Garaulet (J Hum Nutr)</td>
<td>59%</td>
</tr>
<tr>
<td>2008</td>
<td>Garaulet (Nutrition)</td>
<td>4-9%</td>
</tr>
</tbody>
</table>
Conclusions

- Macronutrient composition may be not important in total weight loss (kg)
- Inter-individual variability

However:
- High-fat diets have harmful effects
- Specific hungers (for CH)
- High attrition

Mediterranean diet + behavioral techniques has been demonstrated to be a good alternative for obesity treatment